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THE MOSQUITO-MALARIA PROBLEM IN FLORIDA*

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My extension work during the year has taken me from Pensacola to Miami and over a number of circuits in the northern and central sections of the state. In all of my trips a study of this problem has occupied a good share of my spare time; and I have come unexpectedly to one conclusion which greatly simplifies the solution of the mosquito problem. As an observer who accompanied me on one of my excursions expressed it: "We have been thinking and looking at the big places and have entirely overlooked the little places in which all of our mosquitoes really breed." A rain barrel, a green pool by the watering trough in the barnyard, or a pile of tin cans may not amount to the proverbial "drop in the bucket" compared to the nearby lake, marsh or cypress swamp, and still all the mosquitoes that infest the farm home, the village or town may be breeding in the former places.

Take a few typical cases. At Stuart I found at the rear of a

*Given before the June meeting of the Florida Entomological Society.

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restaurant in the heart of the town a battered sheet iron wash tub, evidently used in its last stages as a garbage receptacle. It was about half full of filthy water. There were scores of mosquito egg-rafts on the surface and the water was alive with larvae and pupae. Mosquitoes were numerous, and there were probably many other similar breeding places, but enough mosquitoes were breeding in that one tub to supply the town. None were found breeding in any of the natural waters.

In Plant City, on the freight station platform, were seven barrels of water, all supplied with eggs and alive with wrigglers in all stages. They were pouring mosquitoes by the thousands into the business center of the city. The septic tank on the outskirts of the city was also found breeding mosquitoes, literally, I think, by the millions. This is a problem for the city engineer. No breeding whatever was found in ditches or bay heads during a number of examinations extending from March through the first half of May.

Dade City furnishes an especially instructive example. Near the A. C. L. depot are extensive water-lily ponds that look from the distance utterly hopeless. Careful examination, however, along their marshy borders, in the worst looking places, revealed only top minnows everywhere and no mosquitoes breeding whatever. Mosquitoes were breeding abundantly in tin cans and rubbish of a large dump alongside of one of these ponds.

The worst night I had during the whole year was spent in a room of a hotel in Haines City. There were inside screens supposed to cover the lower half of the windows, but both lower sashes were immovably stuck about half way up. This left two cracks the width of each window thru which all mosquitoes attracted to the windows could pour into the room. I spent the entire night killing the pests and estimated the casualties roughly at between four and five thousand. In the morning I determined to find out where those mosquitoes were breeding. Diagonally across the street from the hotel was the railroad station and on the freight platform, as usual, were barrels of water, five in this instance. One of these had oil on it. The other four were covered with a solid scum of mosquito eggs and empty pupa cases, and hundreds of mosquitoes could be seen in the act of emerging from the water. The capacity of one of these barrels, I should think, might be 200,000 mosquitoes every ten days. I was told, as usual in such cases, that those barrels didn't amount to anything compared with the numbers that were breeding in the lake.

Again careful examination of the most likely places along the lake shores revealed only schools of minnows and other natural enemies and no mosquito larvae. A boat drawn up to the shore with some water in it showed one or two rafts of eggs and a few young wrigglers. If left a few weeks it might become a breeding place.

I might give many more illustrations that prove the same point. Of course being a stranger and spending, usually, only one day in a place, it was impossible to make a systematic examination of all the backyards, henyards and barnyards of a town; but I have found in most towns the water barrels on the freight platforms breeding enough mosquitoes to make life a burden to the entire community.

Bringing the matter home to us here, mosquitoes, both Anopheles and Culex, are now numerous on the University campus. A recent survey, while not as yet complete, certainly adds evidence to support the position above advanced. At the meter box north of Buckman Hall, where the water mains come in from West University Avenue, both Anopheles and Culex larvae were found in considerable numbers. Many more of both kinds are breeding in the stagnant water that has collected in the bottom of the swimming pool. Culex in great numbers were found in the water pans in the poultry yard back of the kitchen. A few Culex were found in a trash can at the barracks. Culex by thousands were found in a barrel of fertilizer water back of the Experiment Station barn and also in a barrel half full of water near the mule stable. Considerable numbers were breeding in the watering tubs at the dairy and especially, as most of the faucets are dripping continually, in the pools that form on the ground around them. The cement watering troughs and wallowing basins in the hog yards close by contained numbers of wrigglers. On the other hand the three sinks, the small stream in the kitchen garden, and the effluent from the septic tank were all examined and no mosquitoes discovered in them. My observations coincide, in the main, with those reported by Loftin in recent numbers of THE FLORIDA BUGGIST, although he does record finding a few mosquito larvae in "marshes", "ditches" and "sphagnum swamps" where the moss and weeds form wet masses too dense for top minnows to penetrate. And I do not wish to be understood as meaning that mosquitoes do not commonly breed in natural as distinguished from artificial waters. I have many times found them breeding in numbers in the mountain bogs of

Oregon and the Rockies, in the prairie sloughs of Montana and the Dakotas, in the river sloughs and marshes of Wisconsin, and in the swamps of New England. It is thus with the greater surprise that I have found the natural surface waters of Florida so free from them. There is a valid biological reason for this in the fact that Florida waters are so abundantly stocked with natural enemies. Minnows swarm in sinks to all appearances entirely separated from other surface waters. Dragon- and damsel-flies, often called "mosquito hawks", are everywhere in Florida and their aquatic larvae, all carnivorous and active, voracious feeders, make short shrift of mosquito wrigglers in any pools that may be inaccessible to minnows. Then there are the water-bugs, water-scorpions, water-striders, water-boatmen and the whole series of predaceous water-beetles policing both surface and bottom of every pool, stream or lake margin. If man would consistently do his part, I am convinced that natural enemies would effectively do theirs in holding mosquitoes in check in Florida.

How can the people do their part? One home may breed mosquitoes to cover an area at least two hundred yards in diameter. How can we get every home, rich and poor, black and white, to do its share for its own comfort and safety and for that of the whole community? The solution of this problem means more to Florida socially, educationally and financially than possibly that of any other problem in the state. The statistics of our own State Board of Health give a death rate from malaria for 1919 of 41.8 per 100,000 of population; while for other states in the registration area the rate was only 3.2 (for 1917). We try, at least, to provide by law that every citizen shall learn to read and write. Of the two, in Florida, I should prefer to live next door to a man who could not read, if he knew how to prevent the breeding of mosquitoes on his premises, to living alongside of a university professor who didn't know and wouldn't learn enough to do this. Adequate and universally required science lessons in every grammar and high school in Florida offers the only practicable solution for the problem I can find. In what other way can we hope to reach every home?

Probably not one adult in ten has ever seen mosquito eggs, to know them, or has clear ideas about the life history of the insects. Every school child can be given this information in a single well developed science lesson. These lessons are clearly outlined in available books; but the pupils should collect and study the actual

specimens wherever possible. Every school child will then be able to *know* whether or not mosquitoes are breeding anywhere about the home.

The children should be provided with adequate equipment for this work. How many school children have insect nets? (Insect nets, inexpensive and easily made by the children themselves, for collecting in both water and air, were demonstrated.) Here is a weapon with which anyone can sweep up all the mosquitoes in a room in a few minutes. I have saved many a night's sleep with this simple device and have promised myself never to be without one in my future journeys in Florida. With our insect damage tax of over $1,500,000,000 annually every child ought to have and use the insect net during some part of every year of his school course.

Loftin, in the articles referred to, has described mosquito traps that may help in the solution of our problem. These traps are black or dark boxes or crocks set in favorable places about porches and are designed to take advantage of the instinct of mosquitoes to hide in dark holes during daylight, and considerable numbers might be trapped in this way. But we may be pardoned for asking whether the providing and daily tending of these traps might not entail more expense and labor than the entire work of doing away with the breeding places. These traps, too, seem to me to be lacking somewhat in definite attracting power. Are there not always too many other dark places in the dense foliage of trees, weed patches, vines and shrubbery—known to be the natural hiding places of mosquitoes? And could we hope by any arrangement of such traps to catch but comparatively few of the entire number about the premises?*

In making my experiments upon trapping stable flies I think I have caught at least as many mosquitoes in a single night in a single stable window trap as Loftin caught in all his traps in a year. Of course they happened to be there to catch that night, and no real comparison with the Loftin traps is intended. In this case a cow just inside the window supplied adequate attraction. In regions where extensive natural breeding places cannot be drained, filled or oiled, or stocked with fishes, such traps might readily be designed to catch all the mosquitoes that were attracted to house or stable windows, the occupants serving as "bait" but in no danger of being bitten. The traps would not be ex-

*As we understand it, Loftin's traps were intended only for use in closed rooms and exposed porches where natural hiding places for mosquitoes are few or absent.—Ed.

pensive and would catch bushels as easily as dozens, if they were there to catch. They would also be automatic and require no attention except to empty when full. Related as they would be to the one passion of a mosquito's life, the thirst for blood, if we could protect our domestic animals and ourselves with such traps during the hours when mosquitoes are active, we might save not only quantities of blood but catch practically all the breeding mosquitoes within flying distance. In general it is probably true that a mosquito does not produce eggs until she has drawn a meal of blood; so this method, if we could cover all the local sources of blood supply, might yield practical extermination. Quite possibly, too, differences in the mosquito attracting power of different animals might help in the good work. A cow, horse or mule might be found to attract practically all of the mosquitoes away from the wild birds, frogs and toads of a region. Of course these latter suggestions apply only to such places, if any exist in Florida, where extensive natural breeding waters are beyond present possibilities of control and should not be permitted to confuse or obscure the main point of this discussion. This is, that any community in northern Florida and the central part of the peninsula can completely rid itself of mosquitoes and malaria, at practically no expense, just as soon as it can secure the intelligent cooperation of every home in doing away with the strictly artificial and domestic breeding places of the pests. This does not apply to localities within flying distance for migratory species of either the Atlantic or Gulf coasts.

Beginning at home, the University campus should be made and kept absolutely free of mosquitoes. Then Gainesville might well be made a shining example and be in a position to tell other cities exactly how the work was accomplished.

The railroads are all bidding for tourists and settlers and if the attention of officials were called to this matter, orders from headquarters might quickly put a stop to mosquito breeding upon their property.

This is, of course, but a brief summary of the results of my first year's observations on the mosquito-malaria problem in Florida. I am fully convinced, however, that any farm home or community that acts on the above suggestions will be most agreeably surprised at the results. At any rate, will it not be good common sense to be absolutely sure that all the little domestic breeding places are attended to before undertaking expensive draining or oiling operations of swamps and ponds?

(See "Note", p. 14.)

AN APPARENTLY NEW HAPLOTHRIPS FROM CUBA

J. R. WATSON

Haplothrips merrilli, n. sp.

Color: Brown, tarsi and antennal segments 3 and 4 yellowish brown.

Measurements: Total length 1.14 mm.; head, length 0.14 mm., breadth 0.114 mm.; prothorax, length 0.113 mm., breadth 0.20 mm.; mesothorax, breadth 0.19 mm.; abdomen, breadth 0.21 mm.; tube, length 0.086 mm., width at base 0.048 mm., at the apex 0.023 mm.

Antennae: Total length 0.245 mm.

Segment	1	2	3	4	5	6	7	8
Length	25.0	33.0	38.0	37.5	35.4	32.5	32.0	21.4 microns
Breadth	26.7	23.5	20.0	23.0	20.6	20.0	15.5	10.6 microns

Head longer than wide and longer than the prothorax; cheeks slightly convex, sides almost parallel; vertex rounded; surface smooth. Postocular bristles rather long but pale and inconspicuous, knobbed. A pair of smaller bristles in the middle of the dorsum, one at the inner angle of each eye and one behind each posterior ocellus. Eyes rather small, occupying about ⅓ the margin of the head and .6 the breadth; dark red; not pilose; facets small. *Ocelli* much larger than the facets of the eyes; red; bordered by heavy, dark red crescents; situated far forward, the posterior pair opposite the anterior ⅓ of the eyes and close to their margins but not touching; anterior far forward, facing forward. *Mouth cone* reaching .5 or more across prosternum, labium well rounded. Antennae 8-segmented, 1.7 times as long as the head. Segment 1 broad at the base, truncated; 2 constricted near the base into a broad stalk, cut squarely off at the apex; 3 broadly vase-shaped with a rather narrow stalk at the base; 4 oval, broad, short-stalked; 5 and 6 barrel-shaped with a short broad stalk; 7 oblong with a broad base; 8 conical. All provided with many short dark bristles. Sense cones short, colorless and inconspicuous. Three and 4 yellowish brown, the others concolorous with the head and body.

Prothorax a little shorter than the head, anterior margin slightly convex, posterior more so; sides diverging markedly posteriorly; coxae large and conspicuous. Surface free of sculpture. Long but colorless knobbed bristles on each angle and on each coxa; two pair near the posterior border, a smaller pair near the middle and a larger laterad, a small pair near anterior margin.

Pterothorax somewhat narrower than the prothorax (including coxae), sides slightly converging posteriorly; a few faint anastomozing lines near the anterior margin; 3 pairs of small bristles along the anterior margin and at least 6 pair along the sides. *Legs* rather long and slender. Fore femora considerably enlarged. Fore tarsi with a small curved tooth. *Wings* short, membrane reaching about to the fifth abdominal segment; fringing hairs very long, 5 interlocated ones.

Abdomen rather long and narrow, quite so in some specimens; a pair of pale, rather large, knobbed bristles on the posterior angles of each tergite, and three pairs of heavy, curved, dark, sharp-pointed spines on the outer third of each dorsal surface of segments 2-5; the innermost of these, along

(Continued on page 12)

The

FLORIDA ENTOMOLOGIST

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PROFESSOR J. R. WATSON.....*Editor*
DR. WILMON NEWELL.....*Associate Editor*
DR. E. W. BERGER.....*Business Manager*

Issued once every three months. Free to all members of the Society.

Subscription price to non-members is $1.00 per year in advance; 25 cents per copy.

For this number Dr. C. F. Hodge contributes an especially valuable and timely article. There is little doubt but that the mosquito problem is the most important the state, as a whole, has to solve. And the most difficult part of the work is to dissipate the popular notion that little or nothing can be done about it; that mosquitoes are an inevitable part of Florida and therefore best ignored; that it is not good "boosting" to mention the subject; that they fly long distances and mostly breed in swamps and marshes whose drainage at this time is out of the question.

It seems to us that the best and quickest method of eliminating mosquitoes from a town is to hire a man who knows their breeding habits to see to it that no one allows mosquitoes to breed on his premises. We once lived in a town of 10,000 which paid a man to spend his entire time inspecting yards, alleys and vacant lots. That was a clean town and a favorite of tourists and health seekers. As Dr. Hodge remarked before the Society, "Few men can be trusted to know what is in their own back yards".

" * * * and ology it must be with 'all other ologies whatsoever' ". Seventeen letters expressing preference for FLORIDA ENTOMOLOGIST were received by the Secretary in response to the Business Manager's remarks on the change of name of THE BUGGIST (p. 60, vol. III); seven from inspectors in the Nursery Inspection Department (two not members of the Society, two with unpaid dues 2 and 3 years, two with unpaid dues 1920); four from the Quarantine Department (two with unpaid dues 2 years); two from Citrus Canker Inspectors (both dues 2 years unpaid); one grove manager (dues 2 years unpaid); one County

Demonstration Agent (dues paid); and two professional entomologists (dues paid).

It is known that at least one of the movers of the resolution of February 23, while on a trip in the state in June, advised on the matter with one or more of his assistants in the Sand Hill country. Seven responded (three addressing their letters in care of their boss); the next largest number also responded in perfect harmony; the two canker inspectors and an ex-canker inspector addressed their letters in care of their boss and ex-boss.

One writer is "Looking down through the annals of entomology"; another, quite poetical himself, accuses the editor of bursting forth in poetry, but fails to observe that the editor was responsible for neither the poetry on page 72 nor the remarks on page 60. Another "would want a good *english* word".

Now that we are dignified, will the movers of the resolution of February 23 see to it that the delinquent ones pay up their dues and the non-members become members of the Society? 23.—E. W. B.

PERSONALS

Doctor Newell. It was with peculiar pleasure that we read in Science for July 2, among the names of those upon whom the Iowa State College, at the June commencement, conferred the degree of Doctor of Science, that of our most distinguished and widely known member, Wilmon Newell.

Mr. C. A. Bennett, in charge of the camphor thrips investigations at Satsuma, has resigned from the U. S. Bureau of Entomology. He will engage in the garage business in Palatka.

County Agent Marcellus Javens of Lake County, has resigned.

Mr. R. N. Wilson, the first secretary of our society and until recently county agent at Riverside, Cal., now holds a very responsible position as secretary of a legislative committee for agriculture at Sacramento, Cal.

Mr. Thomas H. Jones of the Division of Truck Crop Insect Investigations of the U. S. Bureau of Entomology, who was located at Ft. Myers during the winter, has returned to Baton Rouge, La.

Mr. H. S. Dozier, who has held an entomological fellowship at Ohio State University during the past year, is now with the Mississippi State Plant Board.

There has been recently organized in New Orleans the Louisiana Entomological Society. This is the second entomological society in the South, ours being the first. Among the list of charter members we note the names of two of ours, Thos. H. Jones and O. K. Courtney.

A. C. Mason is now stationed at Orlando, Fla.

Virgil Clark has resigned from State Plant Board and now has charge of Narcoossee Branch of Buckeye Nurseries.

J. C. Goodwin, Chief Clerk State Plant Board, has resigned, effective August 15th. He will take post graduate work at Ames, Iowa, next year.

County Agent K. E. Bragdon has organized a "Bee Club" in Volusia County. The club is giving a picnic on July 16th and has invited Frank Stirling and Chas. Reese to give a talk on apiculture.

SOME RECENT PUBLICATIONS OF INTEREST TO FLORIDIANS

As senior author of Bulletin 833, U. S. Department of Agriculture on the Chrysanthemum Midge-Diarthronomia hypogaea (F. Low.) Dip.—we find the name of one of our members, Mr. C. A. Weigel.

The Canadian Entomologist for March contains a paper by W. S. Blatchley on "Notes on Winter Coleoptera of West and South Florida With Descriptions of New Species". On page 72 he mentions *Polypleurus geminatus* with the statement, "It has not been recorded from Florida". The beetle is included in Dozier's List of the Coleoptera of the Gainesville region.

Among recent Farmers' Bulletins, U. S. Bureau of Entomology, are the following: No. 1097, by F. C. Bishopp, on the Stable Fly. The author illustrates and describes in considerable detail Dr. Hodge's fly trap. No. 1037, by T. E. Snyderison, "White Ants", termites, or as they are commonly called in Florida, "wood lice". No. 1094, by V. L. Wildermuth, treats of "The Alfalfa Caterpillar" *(Eurymus euretheme)*. Although we have little alfalfa in Florida, the butterfly is common. It breeds on various other legumes. No. 1061, by F. H. Chittenden, also treats of a common Florida insect, the Harlequin Cabbage Bug. The map on page 6 "showing the distribution" is very incomplete for Florida.

It shows but two localities, whereas the insect is common the state over.

REPORTS OF MEETINGS

The regular March meeting was postponed until April 5. O. W. Boggs of St. Augustine, was elected to membership. The subject of the evening was "A Round Table Discussion of the Latest Ecological Map of North America and Especially Florida", led by Prof. Watson.

Under Timely Notes Prof. Watson called attention to a species of thrips *(Heterothrips aesculi* Watson—*H. azaleae* Hood), which has been found only in the blossoms of the Swamp Honeysuckle *(Azalea nudiflora)* and the Southern Buckeye *(Aesculus pavia)*. Prof. Watson called attention to the fact that, altho these two plants were not related, the shape of the two blossoms was very similar—long, narrow, dry tubes. He stated that this illustrated what seemed to be a general law governing the distribution of thrips. The physical characteristics of the various habitats of a species are always similar although the different hosts are often not at all related. He also called attention to the fact that a hedge of transplanted azalea on the station grounds had not yet become infested although it had been there several years, less than a quarter of a mile from infested buckeyes, showing that this species, like thrips in general, are slow travellers.

FRANK STIRLING, Temp. Sec.

April 26. Due to the amendment of Article III of the constitution separating the offices of secretary and treasurer, Dr. E. W. Berger was elected treasurer.

The Secretary read a communication received from Mr. John J. Davis, chairman of the National Museum Committee, American Association of Economic Entomologists, urging our Society to call to the attention of the Florida Congressional delegation the urgent needs of the National Museum. The President was instructed to name a committee of three to prepare representations.

J. H. MONTGOMERY, Secretary.

At the June meeting Dr. Hodge presented a report of his in-

vestigations of the breeding places of mosquitoes in Florida. (An abstract of this paper is printed in this number.)

The Secretary read a number of letters in regard to the change of name of the official organ of the Society. The majority of the writers were in favor of the name "FLORIDA ENTOMOLOGIST".

A resolution was passed directing the Secretary to call the attention of the State Board of Health to the breeding of mosquitoes on the property of the railroads and especially in the water barrels on the freight platforms.

Under Timely Notes Prof. Watson called attention to the apparent absence of the camphor thrips from the lower East Coast.

New members elected were: Max Kisliuk, Jr., Scientific Assistant, U. S. Marine Hospital, Wilmington, N. C.; J. G. Grossenbacher and R. E. Lenfest, both of Apopka, Fla.; Wm. E. Stone and Wm. H. Merrill, Agents Bureau of Entomology, U. S. D. A., Daytona, Fla.

AN APPARENTLY NEW HAPLOTHRIPS FROM CUBA

(Continued from page 7)

the posterior border, is especially large and curved sharply inward. Its length is fully ⅓ the width of the abdomen. Terminal bristles longer than the tube.

Male similar but smaller. The fore femora slightly enlarged.

Measurements: Total length 0.86 mm.; head, length 0.13 mm., breadth 0.10 mm.; prothorax, length 0.085 mm., breadth 0.165 mm.; mesothorax, breadth 0.17 mm.; abdomen, 0.16 mm.; tube, length 0.073, width at base 0.04, at apex 0.02 mm.; antenna, total length 0.28 mm.

Segment	1	2	3	4	5	6	7	8
Length	18.7	29.5	34.6	37.0	35.4	32.0	30.8	21.6
Breadth	22.15	22.7	19.2	20.0	19.1	17.2	14.2	9.6

Described from four females and three males collected by Mr. G. B. Merrill from under the cap scales of several cocoanuts taken at quarantine at Key West during March and April, 1920. Type in the author's collection. Paratypes in the National Museum and in that of the University of Florida.

This species is close to H. gowdeyi (Franklin), but differs in many characters, including the shape of the head, absence of striations, color of antennae and abdomen.

NEW THYSANOPTERA FROM FLORIDA—VII

J. R. WATSON

29. Haplothrips orlando Wats. & Osborn.

The original type of this insect (Florida Buggist, Vol. II, No. 4, p. 116) is a male. We now have two females and three additional males. These were collected by beating mostly "oak-runners" *(Quercus pumuli)* in the "flat woods" east of Gainesville, August 9. This is evidently a flat woods insect, as the ecological situation at the type locality near Orlando was similar.

Female. *Measurements:* Total length 1.8 mm.; head, length .21 mm., width .19 mm.; prothorax, length .18, breadth .32 mm.; abdomen, width .44 mm.; tube, length .145, width at base .055, at apex .04 mm.; antennae, segment 1, 40; 2, 53; 3, 67; 4, 62; 5, 53; 6, 50; 7, 49; 8, 48 microns; total, .40 mm. Color identical with that of the male; considerably smaller. Fore femora are but slightly enlarged. Tarsal tooth much smaller, in one ♀ entirely absent. A brown area at the extreme base of the wings. The number of interlocated hairs varies from 15 to 25, usually about 20. Type in the author's collection.

Male. The new males are considerably larger than the type, averaging 2.25 mm. in length. In some of them the tarsal tooth is scarcely half as large as in the type, and no larger than that of one female.

45. Haplothrips statices (Haliday).

Gainesville, Fla., July 10, sweeping in short grass along stream. In some of these specimens, as also in some the writer has from Massachusetts and Oregon, post-ocular bristles are present. In the original description and in Moulton's key they are said to be absent.

A CASE OF SERIOUS SICKNESS DUE TO THE PUSS MOTH CATERPILLAR

The editor recently received from Dr. H. D. Venters of the State Board of Health a caterpillar of the puss moth with the statement that "a boy almost died" from the effects of contact with the larva "which poisoned him similar to the bite of a rattlesnake".

Different individuals react very differently to the poison of various insects. The editor has frequently been "stung" by these larvae which are not uncommon in citrus groves. On him the effects were little more serious than those resulting from contact with a nettle or our common pretty "Horse Nettle" (Solanum sp.). Can it be that different specimens of the insect also vary

immensely in the quantity or quality of their poison? We did not feel sufficiently positive on this point to care to handle that particular caterpillar.

Note—A recent visit to the Dudley place, a large stock farm thirteen miles west of Gainesville, offered the most conclusive proof of my main point as to the ease with which mosquitoes may be controlled. Here we have ideal natural breeding pools all about and scores of farm animals to supply blood and still for three nights I slept between two large windows, wide open, shaded by shrubbery and without screens or netting of any kind without once hearing the song of a mosquito. Keeping the rain water barrels and the cistern stocked with minnows, one or two in each barrel and five or six in the cistern, and strict attention to all watering troughs had completely solved the problem.—C. F. Hodge.

WANTED—To buy or exchange for northern species, southern Chrysopidae (Lace-winged-flies). All stages desired, especially material for biological studies. Will determine specimens. Dr. Roger C. Smith, U. S. Ent. Lab., Charlottesville, Va.

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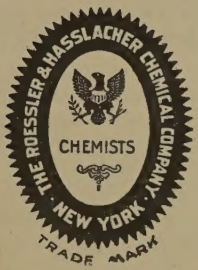

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